

**Storm Water Management Plan
For Priority Projects
(Major SWMP)**

Project Name:	TPM 20830
Permit Number (Land Development Projects):	LOG NO. 04-02-017
Work Authorization Number (CIP):	
Applicant:	Susan Hukari
Applicant's Address:	Box 431, Bonsall, CA 92003
Plan Prepare By (<i>Leave blank if same as applicant</i>):	Wm Karn Surveying, Inc. 129 W. Fig St., Fallbrook CA 92028
Date:	December 18, 2006
Revision Date (If applicable):	January 3, 2007

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DEPARTMENT OF PLANNING
AND LAND USE

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The County of San Diego Watershed Protection, Storm Water Management, and Discharge Control Ordinance (WPO) (Ordinance No. 9424) requires all applications for a permit or approval associated with a Land Disturbance Activity must be accompanied by a Storm Water Management Plan (SWMP) (section 67.804.f). The purpose of the SWMP is to describe how the project will minimize the short and long-term impacts on receiving water quality. Projects that meet the criteria for a priority project are required to prepare a Major SWMP.

Project Review Stage	Does the SWMP need revisions?		If YES, Provide Revision Date
	YES	NO	
TPM 20830		x	

Completion of the following checklist and attachments will fulfill the requirements of a Major SWMP for the project listed above.

PROJECT DESCRIPTION

The 30 +/-acre, Merritt/Hukari project, TPM 20830 is located west of Mountain View Road and southerly of West Lilac Road, a public road in the Bonsall Community Plan Area. The project will take access from a 60" private easement road Mountain View Road, via a 40 ft. private road easement which will end with a 36 ft. radius cul-de-sac. The project will consist of three 4+ acre parcels and an 8 acre parcel with an 8 acre remainder parcel. A watermain approximately 600 ft long will be constructed with the 40 ft. private road easement. The road and cul-de-sac will be constructed to private road standards, approximately 600 feet along an existing paved grove road. The grading for each parcel will be minimal ranging from 500 to 2500 cy. Cutbank will be minimal 17 ft for cuts and up to 25 ft. for fills. Roadway grading will be minimal, 10 ft. +/- cuts, 15 ft. fill. No import or export is proposed.

PRIORITY PROJECT DETERMINATION

Please check the box that best describes the project. Does the project meet one of the following criteria?

PRIORITY PROJECT	YES	NO
Redevelopment within the County Urban Area that creates or adds at least 5,000 net square feet of additional impervious surface area	X	
Residential development of more than 10 units		X
Commercial developments with a land area for development of greater than 100,000 square feet		X
Automotive repair shops		X
Restaurants, where the land area for development is greater than 5,000 square feet		X
Hillside development, in an area with known erosive soil conditions, where there will be grading on any natural slope that is twenty-five percent or greater, if the development creates 5,000 square feet or more of impervious surface	X	
Environmentally Sensitive Areas: All development and redevelopment located within or directly adjacent to or discharging directly to an environmentally sensitive area (where discharges from the development or redevelopment will enter receiving waters within the environmentally sensitive area), which either creates 2,500 square feet of impervious surface on a proposed project site or increases the area of imperviousness of a proposed project site to 10% or more of its naturally occurring condition.		X
Parking Lots 5,000 square feet or more or with 15 parking spaces or more and potentially exposed to urban runoff		X
Streets, roads, highways, and freeways which would create a new paved surface that is 5,000 square feet or greater	X	

Limited Exclusion: Trenching and resurfacing work associated with utility projects are not considered priority projects. Parking lots, buildings and other structures associated with utility projects are subject to SUSMP requirements if one or more of the criteria above are met.

If you answered **NO** to all the questions, then **STOP**. Please complete a Minor SWMP for your project.

If you answered **YES** to any of the questions, please continue.

The following questions provide a guide to collecting information relevant to project stormwater quality issues. Please provide a description of the findings in text box below.

	QUESTIONS	COMPLETED	NA
1.	Describe the topography of the project area.	Gently rolling hills	
2.	Describe the local land use within the project area and adjacent areas.	Agricultural avocados (19) 0.5 DU/Ac	
3.	Evaluate the presence of dry weather flow.	No dry weather	
4.	Determine the receiving waters that may be affected by the project throughout the project life cycle (i.e., construction, maintenance and operation).	Bonsall Hyd. Sub Unit, southerly of the SLR River	
5.	For the project limits, list the 303(d) impaired receiving water bodies and their constituents of concern.	No 303d onsite	
6.	Determine if there are any High Risk Areas (municipal or domestic water supply reservoirs or groundwater percolation facilities) within the project limits.	No high risk areas downstream	
7.	Determine the Regional Board special requirements, including TMDLs, effluent limits, etc.	No special req.	
8.	Determine the general climate of the project area. Identify annual rainfall and rainfall intensity curves.	Annual rainfall 15" to 20"	
9.	If considering Treatment BMPs, determine the soil classification, permeability, erodibility, and depth to groundwater.	Soil Group B & D	
10.	Determine contaminated or hazardous soils within the project area.	No haz. soil onsite	

The project is located in the San Luis Rey Hydrologic Unit. The area is characterized as agricultural with single family homes on 2 and 4 acre parcels. Runoff from the site parallels with West Lilac Road and flows westerly and northerly approximately 2 miles downstream to the San Luis Rey River. Within the project limit there are no 303(d) impaired receiving water and no regional board special requirements. The 30+/- ac area represent 0.046% of the Bonsall HSA.

Complete the checklist below to determine if Treatment Best Management Practices (BMPs) are required for the project.

No.	CRITERIA	YES	NO	INFORMATION
1.	Is this an emergency project		X	If YES, go to 6. If NO, continue to 2.
2.	Have TMDLs been established for surface waters within the project limit?		X	If YES, go to 5. If NO, continue to 3.
3.	Will the project directly discharge to a 303(d) impaired receiving water body?		X	If YES, go to 5. If NO, continue to 4.

No.	CRITERIA	YES	NO	INFORMATION
4.	Is this project within the urban and environmentally sensitive areas as defined on the maps in Appendix B of the <i>County of San Diego Standard Urban Storm Water Mitigation Plan for Land Development and Public Improvement Projects</i> ?		X	If YES, continue to 5. If NO, go to 6.
5.	Consider approved Treatment BMPs for the project.	X		If YES, go to 7.
6.	Project is not required to consider Treatment BMPs			Document for Project Files by referencing this checklist.
7.	End			

Now that the need for a treatment BMPs has been determined, other information is needed to complete the SWMP.

WATERSHED

Please check the watershed(s) for the project.

- | | | | |
|---------------------------------------|--|--|---|
| <input type="checkbox"/> San Juan | <input type="checkbox"/> Santa Margarita | <input checked="" type="checkbox"/> San Luis Rey | <input type="checkbox"/> Carlsbad |
| <input type="checkbox"/> San Dieguito | <input type="checkbox"/> Penasquitos | <input type="checkbox"/> San Diego | <input type="checkbox"/> Pueblo San Diego |
| <input type="checkbox"/> Sweetwater | <input type="checkbox"/> Otay | <input type="checkbox"/> Tijuana | |

Please provide the hydrologic sub-area and number(s)

Number	Name
903.12	Bonsall Hydrological Sub Area

The beneficial uses for Inland Surface Waters and Ground Waters per attached table.

SURFACE WATERS	Hydrologic Unit Basin Number	MUN	AGR	IND	PROC	GWR	FRESH	POW	REC1	REC2	BIOL	WARM	COLD	WILD	RARE	SPWN
Inland Surface Waters	903.12	*	x	x					X	x		x		x		
Ground Waters	903.12	x	x	x												

X Existing Beneficial Use

0 Potential Beneficial Use

* Excepted from Municipal

POLLUTANTS OF CONCERN

Using Table 1, identify pollutants that are anticipated to be generated from the proposed priority project categories. Pollutants associated with any hazardous material sites that have been remediated or are not threatened by the proposed project are not considered a pollutant of concern.

Table 1. Anticipated and Potential Pollutants Generated by Land Use Type

	<i>General Pollutant Categories</i>								
<i>Priority Project Categories</i>	Sediments	Nutrients	Heavy Metals	Organic Compounds	Trash & Debris	Oxygen Demanding Substances	Oil & Grease	Bacteria & Viruses	Pesticides
Detached Residential Development	X	X			X	X	X	X	X
Attached Residential Development	X	X			X	P ⁽¹⁾	P ⁽²⁾	P	X
Commercial Development >100,000 ft ²	P ⁽¹⁾	P ⁽¹⁾		P ⁽²⁾	X	P ⁽⁵⁾	X	P ⁽³⁾	P ⁽⁵⁾
Automotive Repair Shops			X	X ⁽⁴⁾⁽⁵⁾	X		X		
Restaurants					X	X	X	X	
Hillside Development >5,000 ft ²	X	X			X	X	X		X

Priority Project Categories	General Pollutant Categories								
	Sediments	Nutrients	Heavy Metals	Organic Compounds	Trash & Debris	Oxygen Demanding Substances	Oil & Grease	Bacteria & Viruses	Pesticides
Parking Lots	P ⁽¹⁾	P ⁽¹⁾	X		X	P ⁽¹⁾	X		P ⁽¹⁾
Streets, Highways & Freeways	X	P ⁽¹⁾	X	X ⁽⁴⁾	X	P ⁽⁵⁾	X		
X = anticipated P = potential (1) A potential pollutant if landscaping exists on-site. (2) A potential pollutant if the project includes uncovered parking areas. (3) A potential pollutant if land use involves food or animal waste products. (4) Including petroleum hydrocarbons. (5) Including solvents.									

Note: If other monitoring data that is relevant to the project is available. Please include as Attachment C.

CONSTRUCTION BMPs

Please check the construction BMPs that may be used. The BMPs selected are those that will be implemented during construction of the project. The applicant is responsible for the placement and maintenance of the BMPs selected.

- | | |
|---|---|
| <input checked="" type="checkbox"/> Silt Fence | <input type="checkbox"/> Desilting Basin |
| <input checked="" type="checkbox"/> Fiber Rolls | <input checked="" type="checkbox"/> Gravel Bag Berm |
| <input type="checkbox"/> Street Sweeping and Vacuuming | <input type="checkbox"/> Sandbag Barrier |
| <input type="checkbox"/> Storm Drain Inlet Protection | <input checked="" type="checkbox"/> Material Delivery and Storage |
| <input checked="" type="checkbox"/> Stockpile Management | <input checked="" type="checkbox"/> Spill Prevention and Control |
| <input checked="" type="checkbox"/> Solid Waste Management | <input checked="" type="checkbox"/> Concrete Waste Management |
| <input checked="" type="checkbox"/> Stabilized Construction Entrance/Exit | <input checked="" type="checkbox"/> Water Conservation Practices |
| <input type="checkbox"/> Dewatering Operations | <input type="checkbox"/> Paving and Grinding Operations |
| <input type="checkbox"/> Vehicle and Equipment Maintenance | |
- ☒ Any minor slopes created incidental to construction and not subject to a major or minor grading permit shall be protected by covering with plastic or tarp prior to a rain event, and shall have vegetative cover reestablished within 180 days of completion of the slope and prior to final building approval.

SITE DESIGN

To minimize stormwater impacts, site design measures must be addressed. The following checklist provides options for avoiding or reducing potential impacts during project planning. If

YES is checked, it is assumed that the measure was used for this project. If NO is checked, please provide a brief explanation why the option was not selected in the text box below.

	OPTIONS	YES	NO	N/A
1.	Can the project be relocated or realigned to avoid/reduce impacts to receiving waters or to increase the preservation of critical (or problematic) areas such as floodplains, steep slopes, wetlands, and areas with erosive or unstable soil conditions?		X	
2.	Can the project be designed to minimize impervious footprint?		X	
3.	Conserve natural areas where feasible?	X		
4.	Where landscape is proposed, can rooftops, impervious sidewalks, walkways, trails and patios be drained into adjacent landscaping?	X		
5.	For roadway projects, can structures and bridges be designed or located to reduce work in live streams and minimize construction impacts?	X		
6.	Can any of the following methods be utilized to minimize erosion from slopes:	X		
6.a.	Disturbing existing slopes only when necessary?	X		
6.b.	Minimize cut and fill areas to reduce slope lengths?	X		
6.c.	Incorporating retaining walls to reduce steepness of slopes or to shorten slopes?			X
6.d.	Providing benches or terraces on high cut and fill slopes to reduce concentration of flows?			X
6.e.	Rounding and shaping slopes to reduce concentrated flow?	X		
6.f.	Collecting concentrated flows in stabilized drains and channels?	X		

Retaining walls were not necessary as the cut & fill slopes are minor. Again, terraces and benches were not needed because of the minor cut & fill slopes.

If the project includes work in channels, then complete the following checklist. Information shall be obtained from the project drainage report.

No.	CRITERIA	YES	NO	N/A	COMMENTS
1.	Will the project increase velocity or volume of downstream flow?		X		If YES go to 5.
2.	Will the project discharge to unlined channels?	X			If YES go to 5.
3.	Will the project increase potential sediment load of downstream flow?		X		If YES go to 5.
4.	Will the project encroach, cross, realign, or cause other hydraulic changes to a stream that may affect upstream and/or downstream channel stability?		X		If YES go to 7.
5.	Review channel lining materials and design for stream bank erosion.			X	Continue to 6.
6.	Consider channel erosion control measures within the project limits as well as downstream.	X			Continue to 7.

No.	CRITERIA	YES	NO	N/A	COMMENTS
	Consider scour velocity.				
7.	Include, where appropriate, energy dissipation devices at culverts.	X			Continue to 8.
8.	Ensure all transitions between culvert outlets/headwalls/wingwalls and channels are smooth to reduce turbulence and scour.	X			Continue to 9.
9.	Include, if appropriate, detention facilities to reduce peak discharges.			X	
10.	“Hardening“ natural downstream areas to prevent erosion is not an acceptable technique for protecting channel slopes, unless pre-development conditions are determined to be so erosive that hardening would be required even in the absence of the proposed development.			X	Continue to 11.
11.	Provide other design principles that are comparable and equally effective.			X	Continue to 12.
12.	End				

SOURCE CONTROL

Please complete the following checklist for Source Control BMPs. If the BMP is not applicable for this project, then check N/A only at the main category.

BMP		YES	NO	N/A
1.	Provide Storm Drain System Stenciling and Signage			
1.a.	All storm drain inlets and catch basins within the project area shall have a stencil or tile placed with prohibitive language (such as: “NO DUMPING – DRAINS TO OCEAN”) and/or graphical icons to discourage illegal dumping.			x
1.b.	Signs and prohibitive language and/or graphical icons, which prohibit illegal dumping, must be posted at public access points along channels and creeks within the project area.			x
2.	Design Outdoors Material Storage Areas to Reduce Pollution Introduction			
2.a.	This is a detached single-family residential project. Therefore, personal storage areas are exempt from this requirement.			x
2.b.	Hazardous materials with the potential to contaminate urban runoff shall either be: (1) placed in an enclosure such as, but not limited to, a cabinet, shed, or similar structure that prevents contact with runoff or spillage to the storm water conveyance system; or (2) protected by secondary containment structures such as berms, dikes, or curbs.			x
2.c.	The storage area shall be paved and sufficiently impervious to contain leaks and spills.			x
2.d.	The storage area shall have a roof or awning to minimize direct precipitation within the secondary containment area.			x
3.	Design Trash Storage Areas to Reduce Pollution Introduction			

BMP			YES	NO	N/A
3.	Design Trash Storage Areas to Reduce Pollution Introduction				
	3.a.	Paved with an impervious surface, designed not to allow run-on from adjoining areas, screened or walled to prevent off-site transport of trash; or,	x		
	3.b.	Provide attached lids on all trash containers that exclude rain, or roof or awning to minimize direct precipitation.	x		
4.	Use Efficient Irrigation Systems & Landscape Design				
	The following methods to reduce excessive irrigation runoff shall be considered, and incorporated and implemented where determined applicable and feasible.				
	4.a.	Employing rain shutoff devices to prevent irrigation after precipitation.	x		
	4.b.	Designing irrigation systems to each landscape area's specific water requirements.	x		
	4.c.	Using flow reducers or shutoff valves triggered by a pressure drop to control water loss in the event of broken sprinkler heads or lines.	x		
	4.d.	Employing other comparable, equally effective, methods to reduce irrigation water runoff.	x		
5.	Private Roads				
	The design of private roadway drainage shall use at least one of the following				
	5.a.	Rural swale system: street sheet flows to vegetated swale or gravel shoulder, curbs at street corners, culverts under driveways and street crossings.	x		
	5.b.	Urban curb/swale system: street slopes to curb, periodic swale inlets drain to vegetated swale/biofilter.	x		
	5.c.	Dual drainage system: First flush captured in street catch basins and discharged to adjacent vegetated swale or gravel shoulder, high flows connect directly to storm water conveyance system.			x
	5.d.	Other methods that are comparable and equally effective within the project.			x
6.	Residential Driveways & Guest Parking				
	The design of driveways and private residential parking areas shall use one at least of the following features.				
	6.a.	Design driveways with shared access, flared (single lane at street) or wheelstrips (paving only under tires); or, drain into landscaping prior to discharging to the storm water conveyance system.	x		
	6.b.	Uncovered temporary or guest parking on private residential lots may be: paved with a permeable surface; or, designed to drain into landscaping prior to discharging to the storm water conveyance system.	x		
	6.c.	Other features which are comparable and equally effective.			x
7.	Dock Areas				
	Loading/unloading dock areas shall include the following.				
	7.a.	Cover loading dock areas, or design drainage to preclude urban run-on and runoff.			x
	7.b.	Direct connections to storm drains from depressed loading docks (truck wells) are prohibited.			x
	7.c.	Other features which are comparable and equally effective.			x
8.	Maintenance Bays				
	Maintenance bays shall include the following.				

BMP			YES	NO	N/A
8.a.	Repair/maintenance bays shall be indoors; or, designed to preclude urban run-on and runoff.				x
8.b.	Design a repair/maintenance bay drainage system to capture all wash water, leaks and spills. Connect drains to a sump for collection and disposal. Direct connection of the repair/maintenance bays to the storm drain system is prohibited. If required by local jurisdiction, obtain an Industrial Waste Discharge Permit.				x
8.c.	Other features which are comparable and equally effective.				x
9.	Vehicle Wash Areas				
	Priority projects that include areas for washing/steam cleaning of vehicles shall use the following.				
9.a.	Self-contained; or covered with a roof or overhang.				x
9.b.	Equipped with a clarifier or other pretreatment facility.				X
9.c.	Properly connected to a sanitary sewer.				x
9.d.	Other features which are comparable and equally effective.				X
10.	Outdoor Processing Areas				
	Outdoor process equipment operations, such as rock grinding or crushing, painting or coating, grinding or sanding, degreasing or parts cleaning, waste piles, and wastewater and solid waste treatment and disposal, and other operations determined to be a potential threat to water quality by the County shall adhere to the following requirements.				
10.a.	Cover or enclose areas that would be the most significant source of pollutants; or, slope the area toward a dead-end sump; or, discharge to the sanitary sewer system following appropriate treatment in accordance with conditions established by the applicable sewer agency.				x
10.b.	Grade or berm area to prevent run-on from surrounding areas.				x
10.c.	Installation of storm drains in areas of equipment repair is prohibited.				x
10.d.	Other features which are comparable or equally effective.				x
11.	Equipment Wash Areas				
	Outdoor equipment/accessory washing and steam cleaning activities shall be.				
11.a.	Be self-contained; or covered with a roof or overhang.				x
11.b.	Be equipped with a clarifier, grease trap or other pretreatment facility, as appropriate				x
11.c.	Be properly connected to a sanitary sewer.				x
11.d.	Other features which are comparable or equally effective.				x
12.	Parking Areas				
	The following design concepts shall be considered, and incorporated and implemented where determined applicable and feasible by the County.				
12.a.	Where landscaping is proposed in parking areas, incorporate landscape areas into the drainage design.				x
12.b.	Overflow parking (parking stalls provided in excess of the County's minimum parking requirements) may be constructed with permeable paving.				x
12.c.	Other design concepts that are comparable and equally effective.				x
13.	Fueling Area				
	Non-retail fuel dispensing areas shall contain the following.				

BMP			YES	NO	N/A
13.a.	Overhanging roof structure or canopy. The cover's minimum dimensions must be equal to or greater than the area within the grade break. The cover must not drain onto the fuel dispensing area and the downspouts must be routed to prevent drainage across the fueling area. The fueling area shall drain to the project's treatment control BMP(s) prior to discharging to the storm water conveyance system.				x
13.b.	Paved with Portland cement concrete (or equivalent smooth impervious surface). The use of asphalt concrete shall be prohibited.				x
13.c.	Have an appropriate slope to prevent ponding, and must be separated from the rest of the site by a grade break that prevents run-on of urban runoff.				x
13.d.	At a minimum, the concrete fuel dispensing area must extend 6.5 feet (2.0 meters) from the corner of each fuel dispenser, or the length at which the hose and nozzle assembly may be operated plus 1 foot (0.3 meter), whichever is less.				x

Please list other project specific Source Control BMPs in the following box. Write N/A if there are none and briefly explain.

N/A

TREATMENT CONTROL

To select a structural treatment BMP using Treatment Control BMP Selection Matrix (Table 2), each priority project shall compare the list of pollutants for which the downstream receiving waters are impaired (if any), with the pollutants anticipated to be generated by the project (as identified in Table 1). Any pollutants identified by Table 1, which are also causing a Clean Water Act section 303(d) impairment of the receiving waters of the project, shall be considered primary pollutants of concern. Priority projects that are anticipated to generate a primary pollutant of concern shall select a single or combination of stormwater BMPs from Table 2, which **maximizes pollutant removal** for the particular primary pollutant(s) of concern.

Priority projects that are **not** anticipated to generate a pollutant for which the receiving water is Clean Water Act Section 303(d) impaired shall select a single or combination of stormwater BMPs from Table 2, which are effective for pollutant removal of the identified secondary pollutants of concern, consistent with the "maximum extent practicable" standard.

Table 2. Treatment Control BMP Selection Matrix

Pollutant of Concern	Treatment Control BMP Categories						
	Biofilters	Detention Basins	Infiltration Basins ⁽²⁾	Wet Ponds or Wetlands	Drainage Inserts	Filtration	Hydrodynamic Separator Systems ⁽³⁾
Sediment	M	H	H	H	L	H	M
Nutrients	L	M	M	M	L	M	L
Heavy Metals	M	M	M	H	L	H	L
Organic Compounds	U	U	U	M	L	M	L
Trash & Debris	L	H	U	H	M	H	M
Oxygen Demanding Substances	L	M	M	M	L	M	L
Bacteria	U	U	H	H	L	M	L
Oil & Grease	M	M	U	U	L	H	L
Pesticides	U	U	U	L	L	U	L
<p>(1) Copermittees are encouraged to periodically assess the performance characteristics of many of these BMPs to update this table.</p> <p>(2) Including trenches and porous pavement.</p> <p>(3) Also known as hydrodynamic devices and baffle boxes.</p> <p>L: Low removal efficiency: M: Medium removal efficiency: H: High removal efficiency: U: Unknown removal efficiency</p> <p>Sources: <i>Guidance Specifying Management Measures for Sources of Nonpoint Pollution in Coastal Waters</i> (1993), <i>National Stormwater Best Management Practices Database</i> (2001), <i>Guide for BMP Selection in Urban Developed Areas</i> (2001), and <i>Caltrans New Technology Report</i> (2001).</p>							

A Treatment BMP must address runoff from developed areas. Please provide the post-construction water quality values for the project. Label outfalls on the BMP map. Q_{wq} is dependent on the type of treatment BMP selected for the project.

Outfall	Tributary Area (acres)	Q ₁₀₀ (cfs)	Q _{wq} (cfs)
1	AREA A 7acs	16.9	3.88
2	AREA B 7 acs	18.2	4.17
3	AREA C 16 acs	32.2	8.0

Please check the box(s) that best describes the Treatment BMP(s) selected for this project.

Biofilters

☒ Grass swale

☒ Grass strip

☐ Wetland vegetation swale

☐ Bioretention

Detention Basins

☐ Extended/dry detention basin with grass lining

☐ Extended/dry detention basin with impervious lining

Infiltration Basins

- ☐ Infiltration basin
- ☐ Infiltration trench
- ☐ Porous asphalt
- ☐ Porous concrete
- ☐ Porous modular concrete block

Wet Ponds or Wetlands

- ☐ Wet pond/basin (permanent pool)
- ☐ Constructed wetland

Drainage Inserts (See note below)

- ☐ Oil/Water separator
- ☐ Catch basin insert
- ☐ Storm drain inserts
- ☐ Catch basin screens

Filtration

- ☐ Media filtration
- ☐ Sand filtration

Hydrodynamic Separator Systems

- ☐ Swirl Concentrator
- ☐ Cyclone Separator
- ☐ Baffle Separator
- ☐ Gross Solids Removal Device
- ☐ Linear Radial Device

Note: Catch basin inserts and storm drain inserts are excluded from use on County maintained right-of-way and easements.

Include Treatment Datasheet as Attachment E. The datasheet should include the following:	COMPLETED	NO
1. Description of how treatment BMP was designed. Provide a description for each type of treatment BMP.	X	
2. Engineering calculations for the BMP(s)	X	

Please describe why the selected treatment BMP(s) was selected for this project. For projects utilizing a low performing BMP, please provide a detailed explanation and justification.

The project is designed to minimize the use of impervious areas. Streets have been designed to meet the minimum widths. Landscaping will consist of both native and non-native plants. The goal is to achieve plant establishment expeditiously to reduce erosion. The irrigation system for these landscaped areas will be monitored to reduce over irrigation, also proposed bio filter swale for runoff of newly paved areas. Rock rip rap to reduce velocity at discharge point and stormdrain outfalls. Bio filter swales will be 50 ft. long x 10 ft. wide to handle the flow for areas less than 3 acres in area.

MAINTENANCE

Please check the box that best describes the maintenance mechanism(s) for this project.

CATEGORY	SELECTED	
	YES	NO
First	X	
Second		X
Third		X
Fourth		X

ATTACHMENTS

Please include the following attachments.

ATTACHMENT		COMPLETED	N/A
A	Project Location Map	X	
B	Site Map	X	
C	Relevant Monitoring Data		X
D	Treatment BMP Location Map	X	
E	Treatment BMP Datasheets	X	
F	Operation and Maintenance Program for Treatment BMPs	X	
G	Engineer's Certification Sheet	X	

Note: Attachments A and B may be combined.

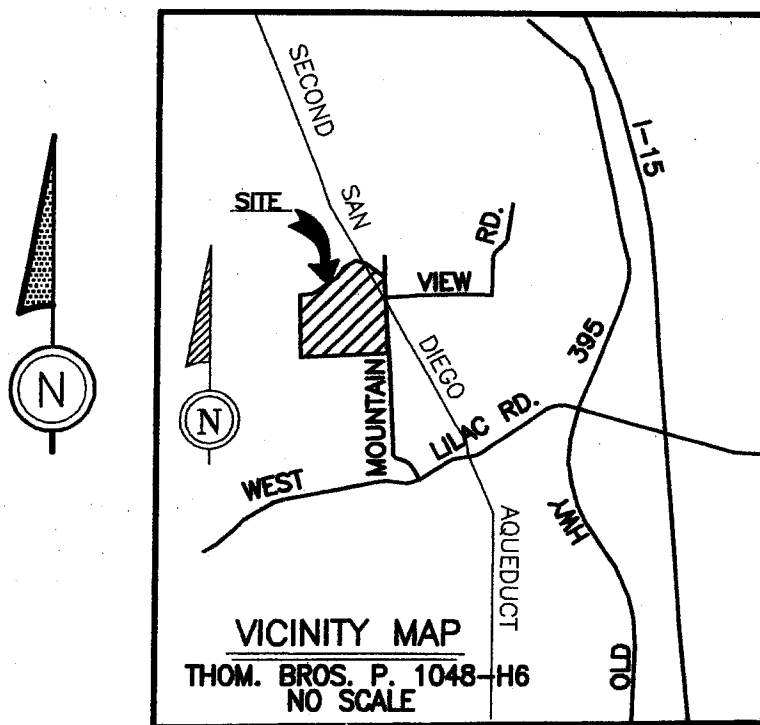
AREA NO.	PRE-DEV. FLOW		POST DEV. FLOW		CHANGE	
	Q ₁₀₀	Q _{WQ}	Q ₁₀₀	Q _{WQ}	Q ₁₀₀	Q _{WQ}
A 7 ACS	15.6 cfs	3.53 cfs	16.9 cfs	3.88 cfs	1.3 cfs	0.35cfs
B 7 ACS	15.6 cfs	3.53 cfs	18.2 cfs	4.17 cfs	2.6 cfs	0.64cfs
C 7 ACS (ONSITE) 9 ACS (OFFSITE)	30.5 cfs	7.49 cfs	32.2 cfs	8 cfs	1.7 cfs	0.51cfs

The increase flow in Area A, B, & C will be mitigated by the proposed grass lined swales. The property owner upon which the grass swales are located will be responsible for maintaining of the individual grass swales.

Summary/Conclusion: The combination of proposed construction and post-construction BMPs will reduce, to the maximum extent practicable, the expected pollutants and will not adversely impact the beneficial uses or water quality of the receiving waters.

ATTACHMENT A

LOCATION MAP



ATTACHMENT B

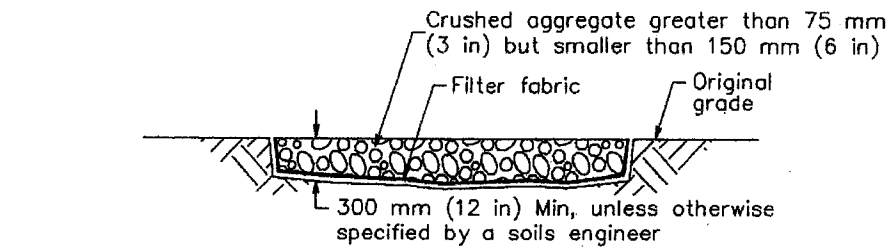
PROJECT SITE MAP

ATTACHMENT D

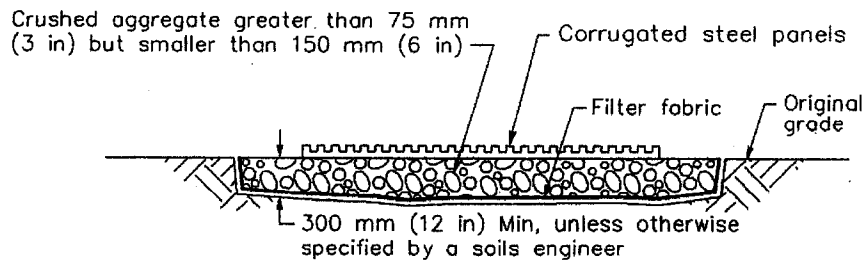
TREATMENT BMP LOCATION MAP

Stabilized Construction Entrance/Exit

TC-1

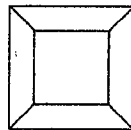


SECTION B-B
NTS

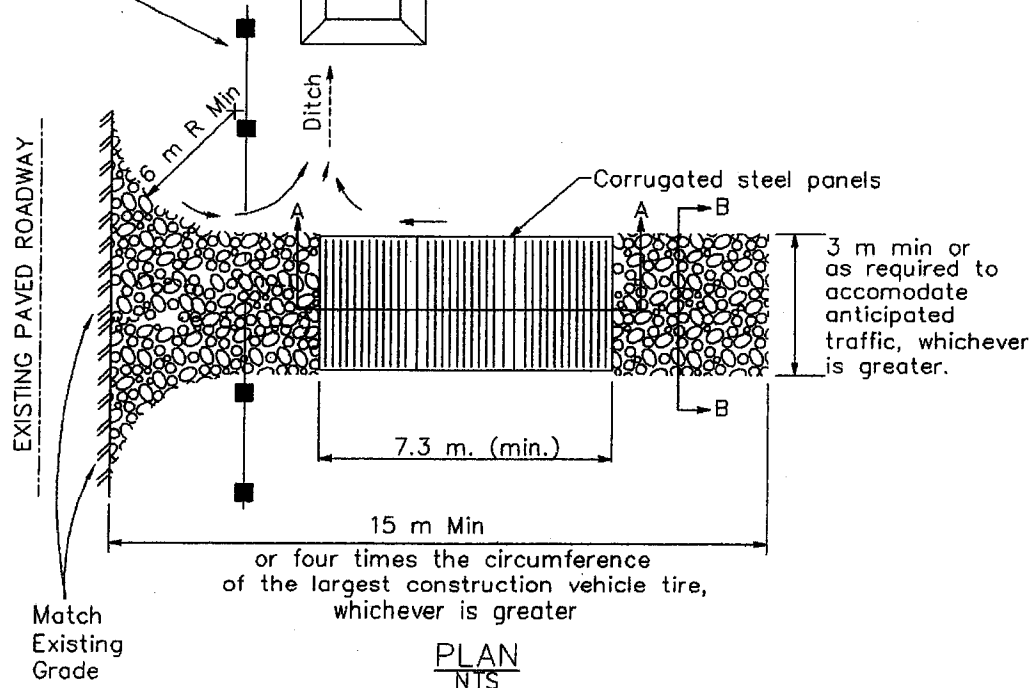


SECTION A-A
NOT TO SCALE

NOTE:
Construct sediment barrier and channelize runoff to sediment trapping device



Sediment trapping device

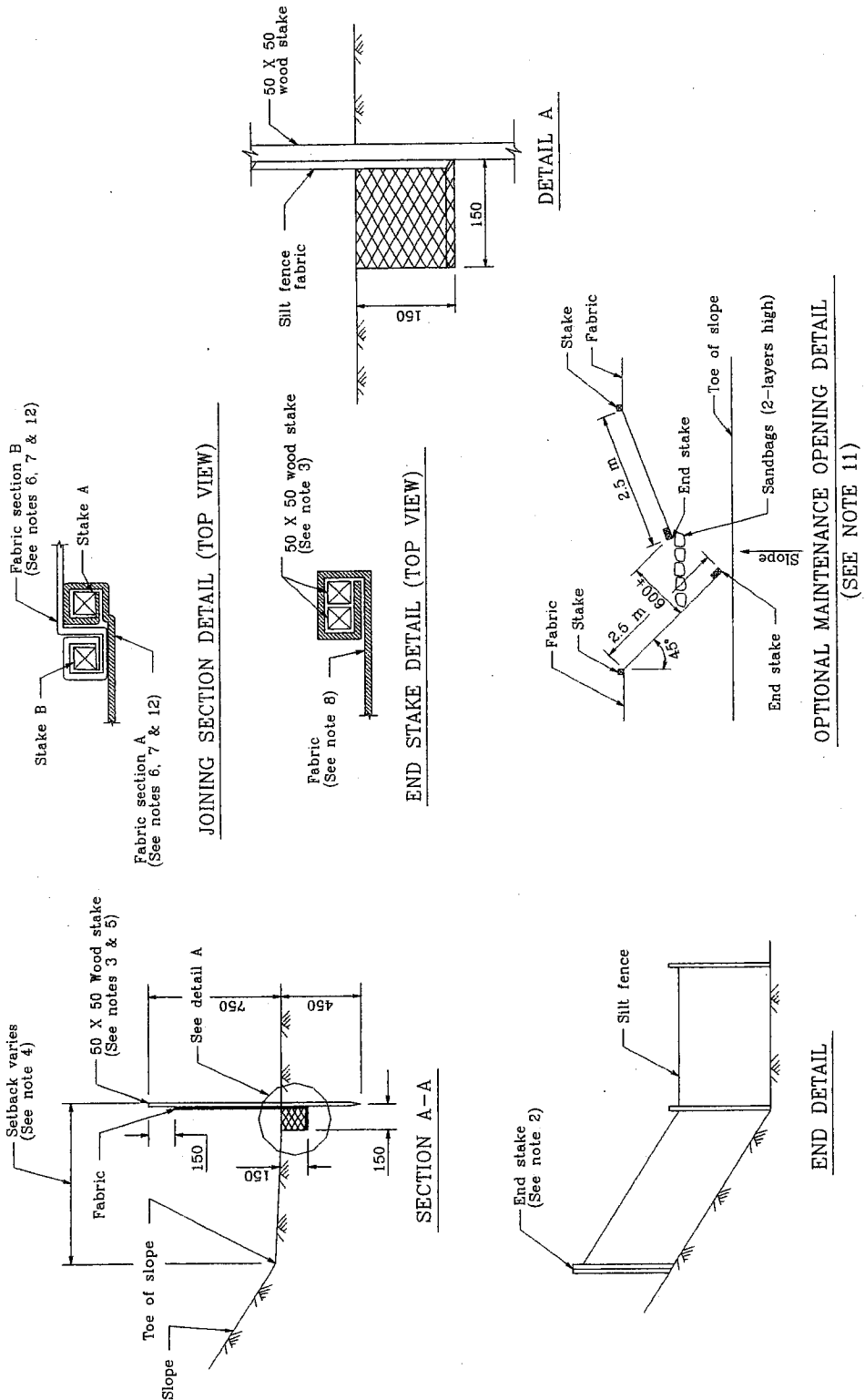


Stabilized Construction Entrance/Exit (Type 2)



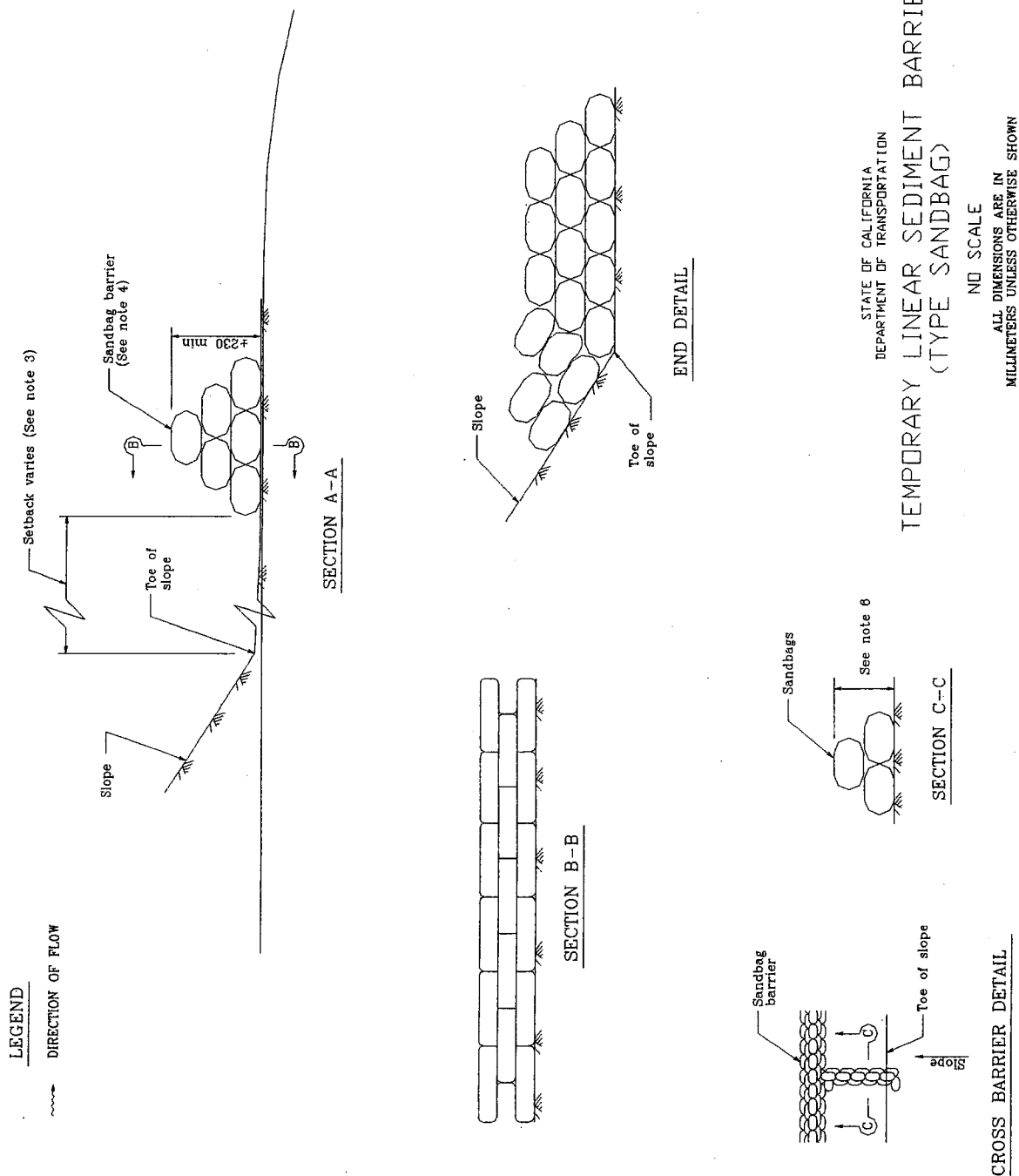
Silt Fence

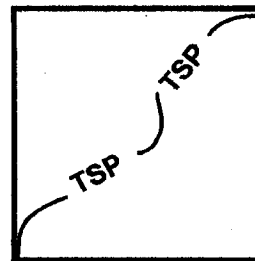
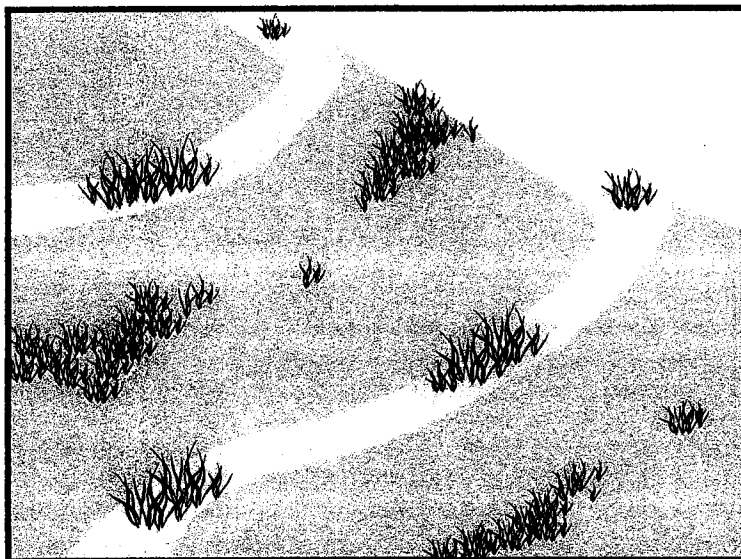
SC-1



Sandbag Barrier

SC-8





Standard Symbol

BMP Objectives

- Soil Stabilization
- Sediment Control
- Tracking Control
- Wind Erosion Control
- Non-Storm Water Management
- Materials and Waste Management

Definition and Purpose

Hydroseeding typically consists of applying a mixture of wood fiber, seed, fertilizer, and stabilizing emulsion with hydro-mulch equipment, which temporarily protects exposed soils from erosion by water and wind. This is one of five temporary soil stabilization alternatives to consider.

Appropriate Applications

- Hydroseeding is applied on disturbed soil areas requiring temporary protection until permanent vegetation is established or disturbed soil areas that must be re-disturbed following an extended period of inactivity.

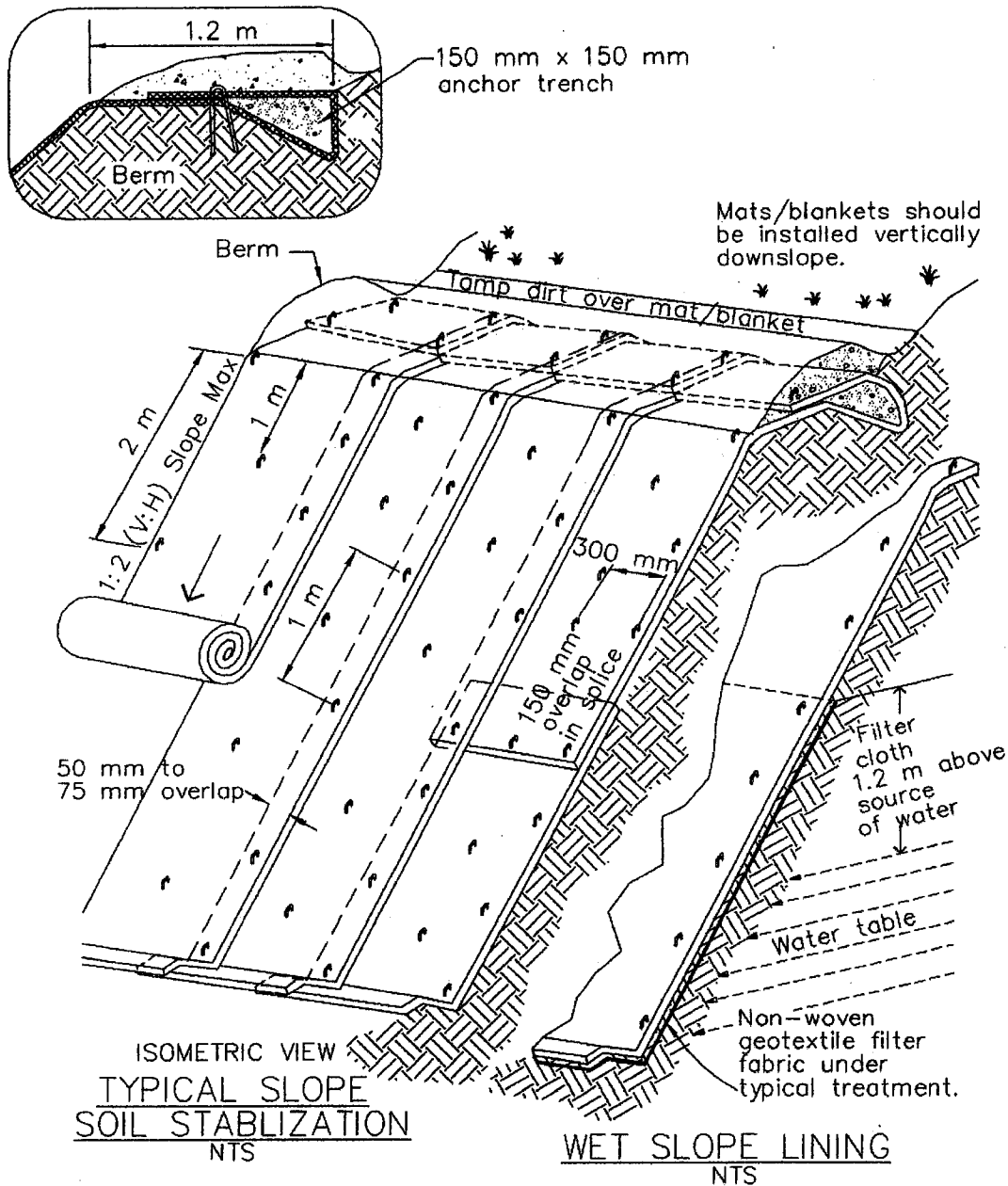
Limitations

- Hydroseeding may be used alone only when there is sufficient time in the season to ensure adequate vegetation establishment and erosion control. Otherwise, hydroseeding must be used in conjunction with a soil binder or mulching (i.e., straw mulch), refer to BMP SS-5, Table 1 for options.
- Steep slopes are difficult to protect with temporary seeding.
- Temporary seeding may not be appropriate in dry periods without supplemental irrigation.
- Temporary vegetation may have to be removed before permanent vegetation is applied.
- Temporary vegetation is not appropriate for short-term inactivity.

Geotextiles, Mats, Plastic Covers and Erosion Control Blankets

SS-7

Typical Installation Detail



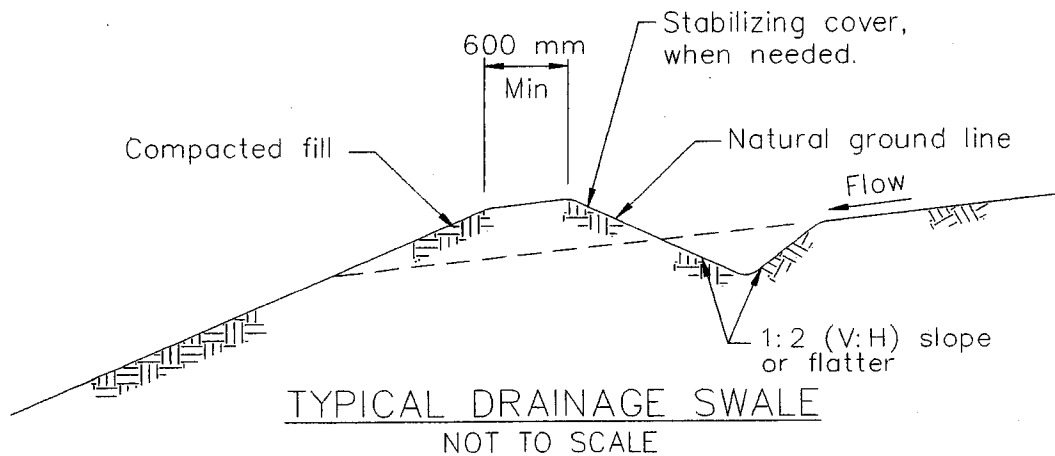
NOTES:

1. Slope surface shall be free of rocks, clods, sticks and grass. Mats/blankets shall have good soil contact.
2. Lay blankets loosely and stake or staple to maintain direct contact with the soil. Do not stretch.
3. Install per manufacturer's recommendations



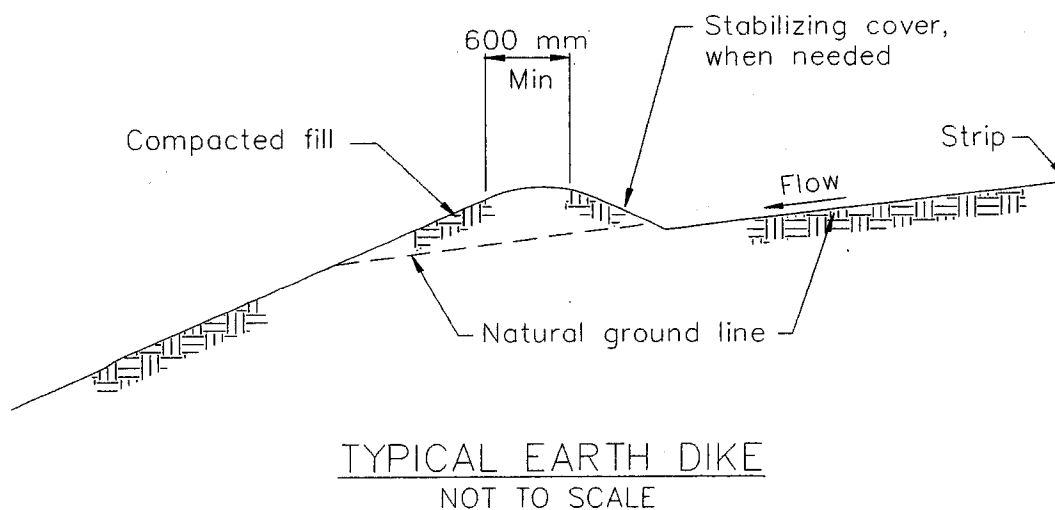
Earth Dikes/Drainage Swales and Lined Ditches

SS-9



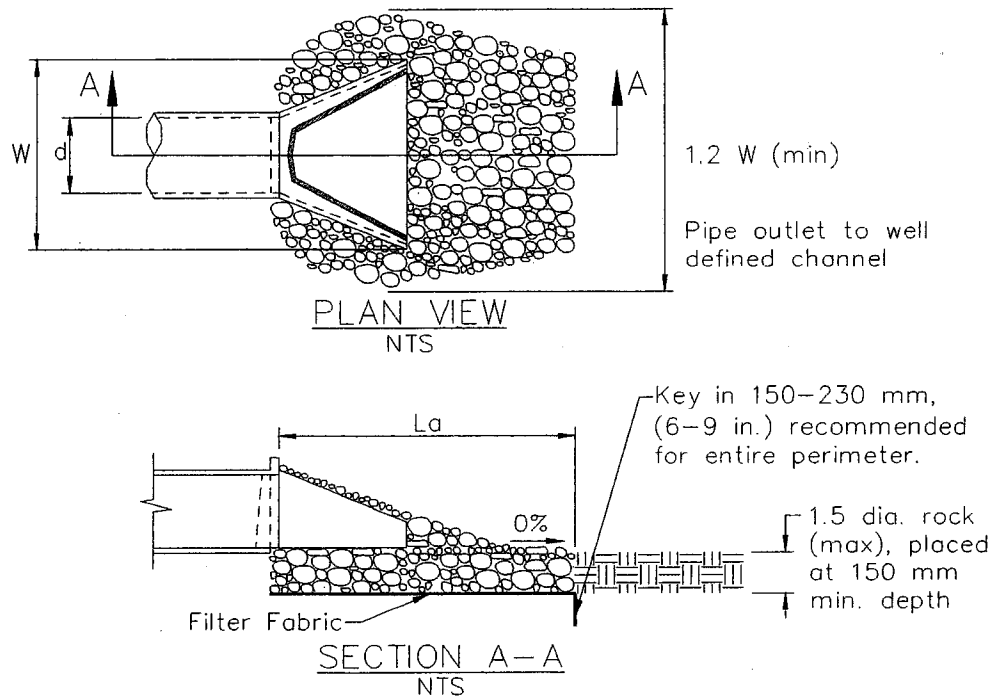
NOTES:

1. Stabilize inlet, outlets and slopes.
2. Properly compact the subgrade, in conformance with Section 19-5 of the Caltrans Standard Specifications.



Outlet Protection/Velocity Dissipation Devices

SS-10

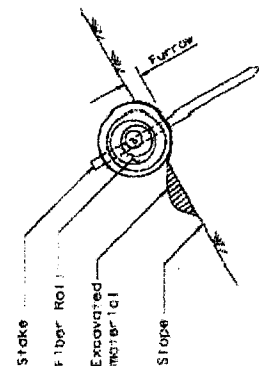


Pipe Diameter mm	Discharge m ³ /s	Apron Length, La m	Rip Rap D ₅₀ Diameter Min mm
300	0.14	3	100
	0.28	4	150
450	0.28	3	150
	0.57	5	200
	0.85	7	300
	1.13	8	400
600	0.85	5	200
	1.13	8	200
	1.42	8	300
	1.70	9	400

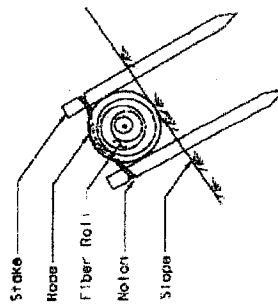
For larger or higher flows, consult a Registered Civil Engineer

Source: USDA – SCS

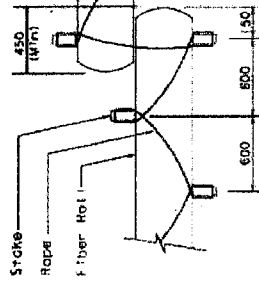




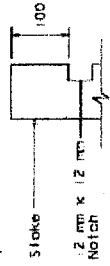
SECTION
TEMPORARY FIBER ROLL
(TYPE 1)



SECTION



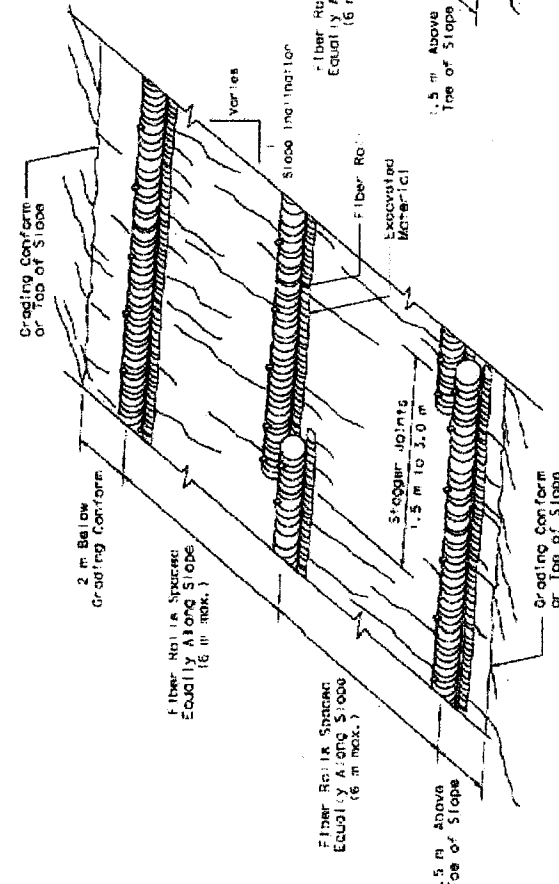
PLAN



ELEVATION
NOTCH DETAIL

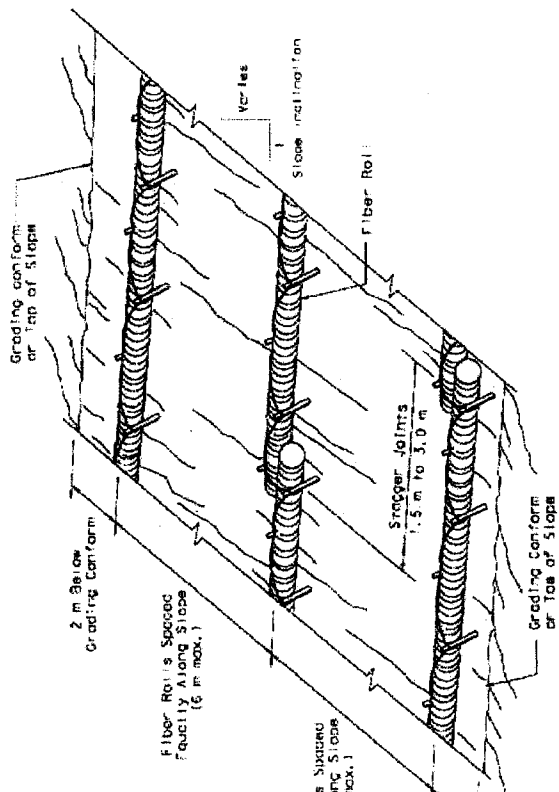
NOTE

1. Temporary fiber roll spacing varies depending upon slope inclination.



PERSPECTIVE

TEMPORARY FIBER ROLL (TYPE 1)



PERSPECTIVE

TEMPORARY FIBER ROLL (TYPE 2)

ATTACHMENT E

TREATMENT BMP DATASHEET

TPM 20830

On Site
Preliminary Drainage Study

Area "A" Area = 7 acres

Soil Group C

Watershed L = 850 ft.
Watershed H = 152 ft.
S = 17%

C = 0.36

Tc = 3 + 6.4 + 9.4

Pre Construction

Q_{wQ} = 0.36(1.4)(7)
Q_{wQ} = 3.53 cfs
Q₁₀₀ = 0.36(6.2)(7)
Q₁₀₀ = 15.6 cfs

I_{wQ} = 1.4 in/hr
I₁₀₀ = 6.2 in/hr

Post Construction

0.5 acs developed

$$C_R = \frac{0.36(6.5) + 0.78(0.5)}{7}$$

C_R = 0.39

Change in flow

Q_{wQ} = 0.396(1.4)(7)
Q_{wQ} = 3.88

Q_{wQ} = 0.35 cfs 9.9%
Q₁₀₀ = 1.3 cfs 8%

Q₁₀₀ = 0.39(6.2)(7)
Q₁₀₀ = 16.9 cfs

Increase flows will be mitigated by onsite by grass swales

Area "B" Area = 7 acres

Soil Group C

Watershed L = 900 ft.
Watershed H = 160 ft.
S = 17%

$$C = 0.36$$

$$T_c = 3 + 6.4 + 9.4$$

Pre Construction

$$Q_{wQ} = 0.36(1.4)(7)$$

$$Q_{wQ} = 3.53 \text{ cfs}$$

$$Q_{100} = 0.36(6.2)(7)$$

$$Q_{100} = 15.6 \text{ cfs}$$

$$I_{wQ} = 1.4 \text{ in/hr}$$

$$I_{100} = 6.2 \text{ in/hr}$$

Post Construction

Area developed 1 ac

$$C_R = \frac{0.36(6.5) + 0.78(1)}{7}$$

$$C_R = 0.42$$

$$Q_{wQ} = 0.426(1.4)(7)$$

$$Q_{wQ} = 4.17 \text{ cfs}$$

$$Q_{100} = 0.42(6.2)(7)$$

$$Q_{100} = 18.2 \text{ cfs}$$

Increase flow

$$Q_{wQ} = 0.64 \text{ cfs} = 18\%$$

$$Q_{100} = 2.6 \text{ cfs} \quad 16.6\%$$

Increase flows will be mitigated by onsite by grass swales

Area "C" 7 acres on site 9 acs off site Total 16 acs.

Soil Group C

Watershed L = 1500 ft.
Watershed H = 189 ft.
S = 12.6%

$$C = 0.36$$

$$T_c = 5.4 + 6.4 = 11.8$$

Pre Construction

$$Q_{wQ} = 0.36(1.3)(16)$$

$$Q_{wQ} = 7.49 \text{ cfs}$$

$$Q_{100} = 0.36(5.3)(16)$$

$$Q_{100} = 30.5 \text{ cfs}$$

$$I_{wQ} = 1.3 \text{ in/hr}$$

$$I_{100} = 5.3 \text{ in/hr}$$

Post Construction

Area developed 0.85 ac

$$C_R = \frac{15.15(.36) + 0.85(0.78)}{16}$$

$$C_R = 0.38$$

$$Q_{wQ} = 0.386(1.3)(16)$$

$$Q_{wQ} = 8 \text{ cfs}$$

$$Q_{100} = 0.38(5.3)(16)$$

$$Q_{100} = 32.2 \text{ cfs}$$

Increase flow

$$Q_{wQ} = 0.51 \text{ cfs} = 6.8\%$$

$$Q_{100} = 1.7 \text{ cfs} \quad 5.6\%$$

Increase flows will be mitigated by onsite by grass swales

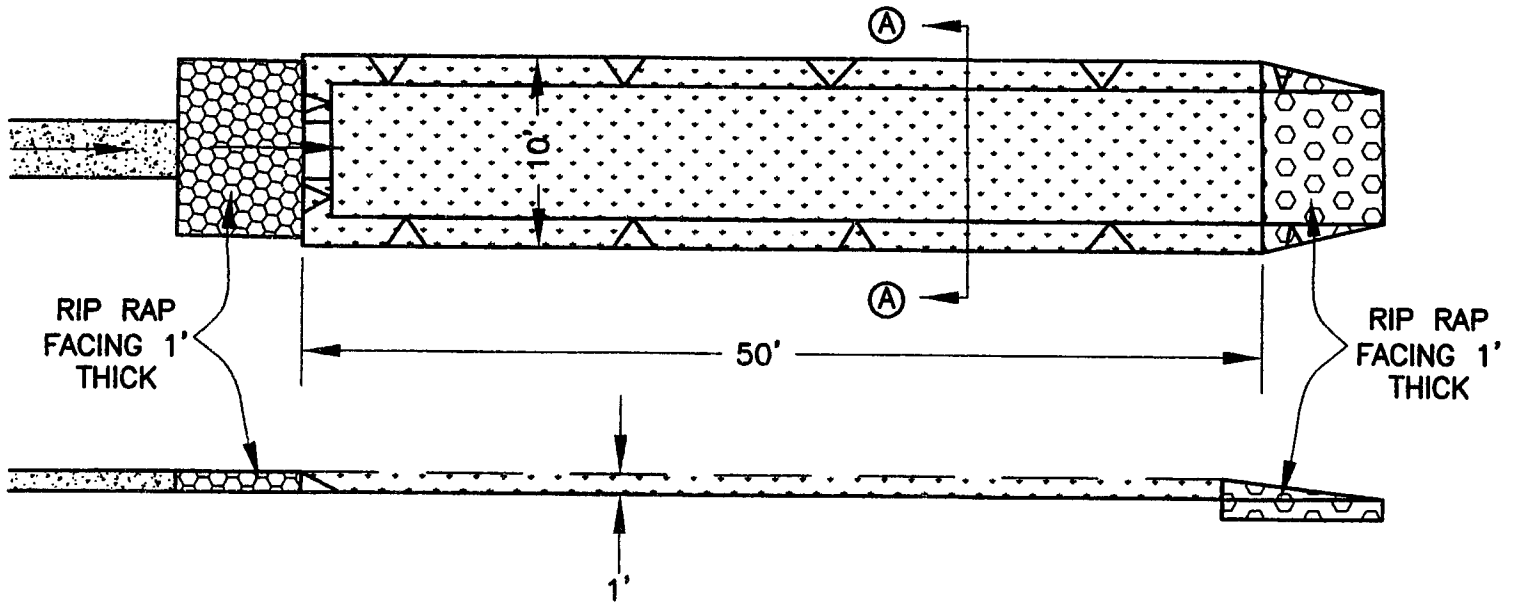
TPM 20830
LOG NO. 04-02-017
TABLE PRE-DEVELOPMENT vs. POST DEVELOPMENT
100 YR. FLOW

<u>AREA NO.</u>	<u>PRE-DEV. FLOW</u>		<u>POST DEV. FLOW</u>		<u>CHANGE</u>	
	<u>Q₁₀₀</u>	<u>Q_{wq}</u>	<u>Q₁₀₀</u>	<u>Q_{wq}</u>	<u>Q₁₀₀</u>	<u>Q_{wq}</u>
A 7 ACS	15.6 cfs	3.53 cfs	16.9 cfs	3.88 cfs	1.3 cfs	0.35cfs
B 7 ACS	15.6 cfs	3.53 cfs	18.2 cfs	4.17 cfs	2.6 cfs	0.64 cfs
C 7 ACS (ONSITE) 9 ACS (OFFSITE)	30.5 cfs	7.49 cfs	32.2 cfs	8 cfs	1.7 cfs	0.51 cfs

Increase flows mitigated by grass swales

NOTE: HYDROSEED GRASS SWALE (BIO-FILTER) WITH NATIVE SPECIES MIX INCLUDING HEMIZONIA FASCIULATA, LOTUS SCOPARIUS BREVIATATUS, ESCHSCHOLZIA MEXICANA, MIMULUS AURANTIACUS PUNICEUS, ERIOPHYLLUM CONFERTIFLORM, AND LASTHENIA CALIFORNICA.

APPLICATION RATE: 6 POUNDS PER 1000 SQ. FT.



DETAIL OF GRASS SWALE (BIO-FILTER)
 SCALE: 1" = 10'

ONSITE FLOW

AREA NO. 3 ABOVE CUL-DE-SAC

Area = 3 Acs.

Watershed L = 450 ft.

Watershed H = 80 ft.

Soil Group "C"

S = 17%

POST CONSTRUCTION

CR = 0.42

$T_c = 2 + 6.4 = 8.4$

$Q_{10} = 0.42(4.2)(3)$

I10 = 4.2 in/hr

$Q_{10} = 5.29$ cfs

I100 = 6.8 in/hr

$Q_{100} = 0.42(6.8)(3)$

$I_{WQ} = 1.5 \text{ in/hr}$

$Q_{100} = 8.6$ cfs

$Q_{WQ} = 0.42(1.5)(3)$

Capacity 18" culvert

$Q_{WQ} = 1.9 \text{ cfs}$

$Q = 10 \text{ cfs}$ $\frac{HW}{D} = 1.5$

Exceed 8.6 cfs \therefore OK

AREA 4 ABOVE DRIVEWAY TO PARCEL 4 AND ACCESS ROAD

Area = 12 acs

Watershed L = 1200 ft.

Watershed H = 144 ft.

Soil Group "C"

S = 12%

POST CONSTRUCTION

CR = 0.38

$T_c = 4 + 6.4 = 10.4$

$Q_{10} = 0.38(3.8)(12)$

I10 = 3.8 in/hr

$Q_{10} = 17.3$ cfs

I100 = 5.8 in/hr

$Q_{100} = 0.38(5.8)(12)$

$I_{WQ} = 1.4 \text{ in/hr}$

$Q_{100} = 26.4$ cfs

$Q_{WQ} = 0.38(1.4)(12)$

Capacity 24" culvert

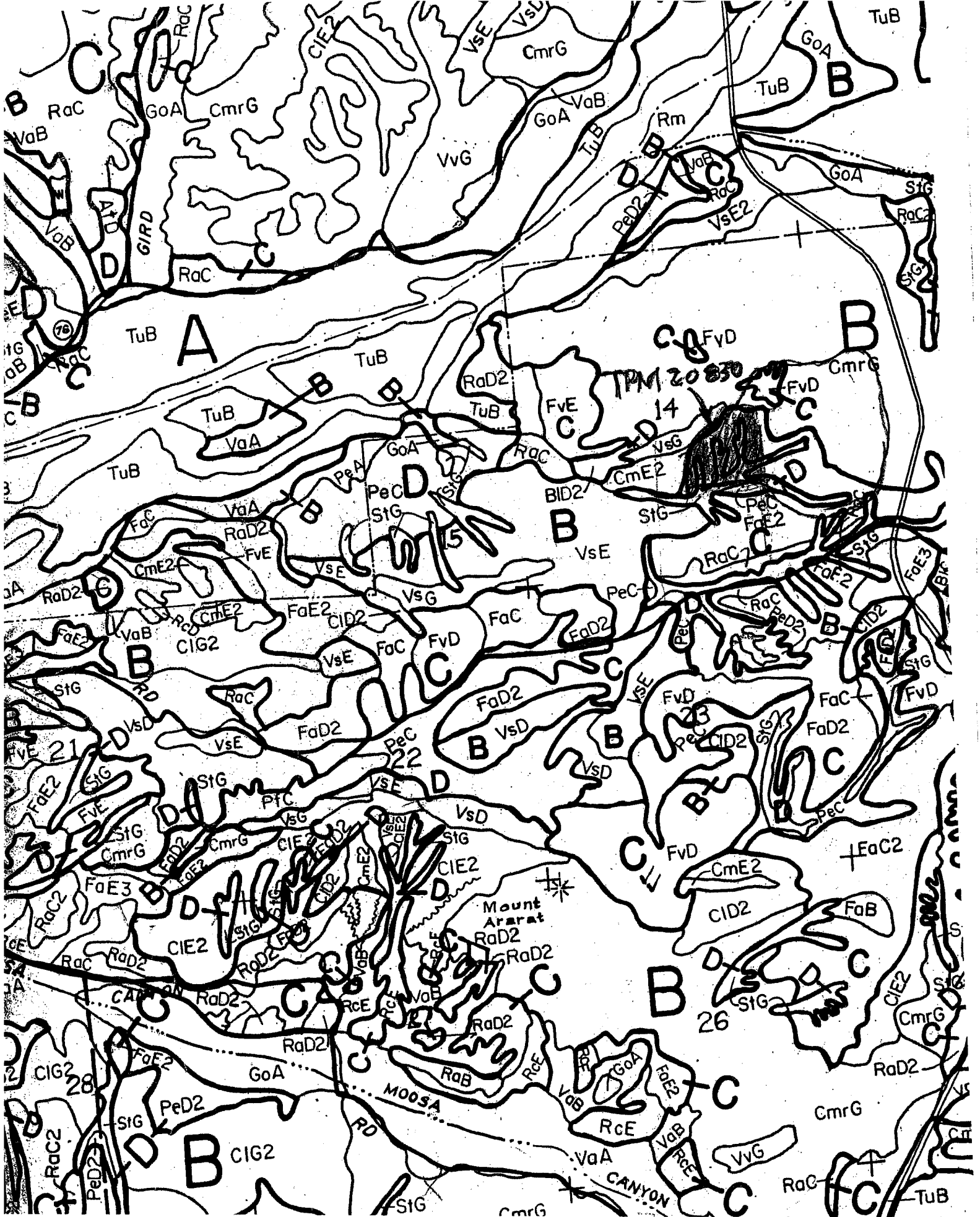
$Q_{WQ} = 6.4 \text{ cfs}$

$\frac{HW}{D} = 2$

D

= 26.4 cfs \therefore OK

Prepared by:
Hadley Johnson
RCE 14870
2/14/2006



**85th Percentile Precipitation
Isoplethial Map
Rainfall in Inches**

**DRAFT
6/27/01**



Map Series July 02, 2001
Imperial County, California
85th Percentile Precipitation
Isoplethial Map
Rainfall in Inches
Scale: 1 inch = 10 miles
North Arrow



ATTACHMENT F

OPERATION AND MAINTENANCE PROGRAM FOR TREATMENT BMP

1 of 16
1/23/2003

Appendix H Estimated O&M Cost for Treatment BMPs - Details


APPENDIX H Estimated O & M Costs for BMP Project

Estimated values derived from Culture Field BMP Study. This spreadsheet will change as additional data becomes available.						Labor			Equipment			Materials		Total	Comments	
						Per. Hrs	Rate	Cost	Type	Days	Rate	Cost	Item	Cost	Cost	
BIOFILTER - STRIPS and SWALES																
Preventive Maintenance and Routine Inspections																
ROUTINE ACTIONS	MAINTENANCE INDICATOR	FIELD MEASUREMENT	MEASUREMENT FREQUENCY	MAINTENANCE ACTIVITY	SITE-SPECIFIC REQUIREMENTS											
Height of vegetation	Average vegetation height exceeds 12 inches, emergence of trees, or woody vegetation	Visual inspection of vegetation throughout strip/swale	Once during wet season, once during dry season (depending on growth)	Cut vegetation to an average height of 6 inches	Remove any trees, or woody vegetation.	10	43.63	436.3	one-ton truck & hydroseeder	2	26.64	53.28	sitting blower, rake, fork, bags, safety equipment	50	639.96	
Assess adequate vegetative cover	Less than 90 percent coverage in strip (swale) or less than 70 percent on swale side slope	Visual inspection of strip/swale. Prepare a site schematic to record location and distribution of bare or browning spots to be restored. File the schematic for assessment of persistent problems.	Assess quality needed in May each year late wet season and late dry season.	Re-seed/revegetate bare spots by Nov. Sharply area to be restored, to a depth of 2-inches. Restore side slope coverage with hydroseed mixture.		0	43.63	348.04	one-ton truck & hydroseeder	1	48.15	48.15	seed	150	547.19	
						0	43.63	0	one-ton truck & hydroseeder	0	26.64	0			0	
Inspect for debris accumulation	Debris or litter present	Visual observation	During routine training, per District schedule.	Remove litter, and debris.	None	0	0	0	one-ton truck & hydroseeder	0	0	0	blanket	0	0	
Inspect for accumulated sediment	Sediment at or near vegetation height, channeling of flow, inhibited flow due to change in slope.	Visual observation	Annually	Remove sediment. If flow is channelled, determine cause and take corrective action. If sediment becomes deep enough to change the flow gradient, remove sediment during dry season, characterize and properly dispose of sediment, and revegetate.		18	43.63	785.34	one-ton truck & hydroseeder	1	48.15	48.15	seed, testing and disposal of sediment	300	1046.25	once every three years
Inspect for burrows	Burrows, holes, mounds	Visual observation	Annually and after vegetation thinning.	Notify engineer to determine if regrading is necessary. If necessary, regrade to design specification and revegetate strip/swale. If regrading is necessary, the process should start in May. Revegetate strip/swale in Nov. Target completion prior to wet season. Where burrows cause seepage, erosion and leakage, backfill immediately.	None	2	43.63	87.26							87.26	
						0	0	0	one-ton truck & hydroseeder	0	26.64	0			0	
General Maintenance Inspection	Inlet structures, outlet structures, side slopes or other features damaged, significant erosion, emergence of trees, woody vegetation, fence damage, etc.	Visual observation	Semi-Annually, late wet season and late dry season.	Corrective action prior to wet season. Consult engineer if an immediate solution is not evident.	Remove any trees, or woody vegetation.	18	43.63	785.34	one-ton truck & hydroseeder	2	26.64	53.28			751.78	
TOTAL BIO FILTER AND SWALES						82		2288.78				203.68		800	2872.42	

ATTACHMENT G

CERTIFICATION SHEET

This Stormwater Management Plan has been prepared under the direction of the following Registered Civil Engineer. The Registered Civil Engineer attests to the technical information contained herein and the engineering data upon which recommendations, conclusions, and decisions are based.


HADLEY JOHNSON
REGISTERED CIVIL ENGINEER 14870

MARCH 30, 2007
DATE

